<center>Claims</center>

1   1. A thermogravimetric analyzer comprising:

2   a flexural plate wave mass sensor comprising a sample-holding region;

3   a flexural plate wave reference sensor;

4   a heat spreader configured to conduct heat substantially evenly to the mass sensor and the

5   reference sensor;

6   a heater in thermal communication with the heat spreader;

7   an analysis module, in electrical communication with the mass sensor and the reference

8   sensor, for determining, based on outputs of the mass sensor and the reference sensor, a change

9   in mass of a sample in the sample-holding region caused by action of the heater.

1   2. The thermogravimetric analyzer of claim 1 wherein the heater is a variable-output,

2   controllable heater.

1   3. The thermogravimetric analyzer of claim 2 further comprising:

2   a control module in electrical communication with the heater for varying the heat output

3   of the heater in accordance with an analytical protocol.

1   4. The thermogravimetric analyzer of claim 3 wherein the control module causes the heater to

2   heat the sample in accordance with a pre-determined time-temperature pattern.

1   5. The thermogravimetric analyzer of claim 1 further comprising:

2   a temperature sensor in thermal communication with the mass sensor; and

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3   a temperature sensor in thermal communication with the reference sensor, the analysis

4   module analyzing the determined change in mass in relation to the outputs of the temperature

5   sensors.

1   6. The thermogravimetric analyzer of claim 1 further comprising a plurality of flexural plate

2   wave mass sensors arranged in an array.

1   7. The thermogravimetric analyzer of claim 6 further comprising a plurality of flexural plate

2   wave reference sensors, each flexural plate wave sensor corresponding to and outputting a

3   reference signal for one of the arrayed plurality flexural plate wave mass sensors.

1   8. A method of conducting thermogravimetric analysis comprising:

2   providing a flexural plate wave mass sensor configured to output a mass signal;

3   depositing a sample in the mass sensor;

4   providing a flexural plate wave reference sensor configured to output a reference signal;

5   evenly heating the mass sensor and the reference sensor; and

6   determining a change in mass of the sample in response to the heating based on the mass

7   signal and the reference signal.

1   9. The method of claim 8 further comprising:

2   measuring a mass output from the mass sensor;

3   measuring a reference output from the reference sensor; and

4   subtracting the reference output from the mass output.

1   10. The method of claim 8 further comprising monitoring the temperatures of the mass sensor

2   and the reference sensor as the sample is heated.

1   11. The method of claim 10 further comprising determining a heat-mass response

2   characterization of a sample based on the determined mass changes in relation to the monitored

3   temperatures.

1   12. The method of claim 10 further comprising determining a heat-mass-time response

2   characterization of a sample based on the determined mass changes, the monitored temperatures,

3   and the time at which the sample was maintained at the monitored temperatures.

1   13. The method of claim 8 wherein the heating is controlled in accordance with an analysis

2   protocol.

1   14. The method of claim 8 wherein the heating is controlled in accordance with a pre-

2   determined time-temperature pattern.